

SEQUENCE LISTING

<110> Scott, Fred W.

<120> Recombinant Multivalent Viral Vaccine

<130> 18617.0016

<140> 08/552,369

<141> November 3, 1995

<160> 25

<210> 1

<211> 2254

<212> DNA

<213> feline panieukopenia virus

<220>

<223>

<400> 1

atg agt gat gga gca gtt caa cca gac ggt ggt caa cct gct gtc 45
Met Ser Asp Gly Ala Val Gln Pro Asp Gly Gly Gln Pro Ala Val
 5 10 15

aga aat gaa aga gct aca gga tct ggg aac ggg tct gga ggc ggg 90
Arg Asn Glu Arg Ala Thr Gly Ser Gly Asn Gly Ser Gly Gly Gly
 20 25 30

ggt ggt ggt tct ggg ggt gtg ggg att tct acg ggt act ttc 135
Gly Gly Gly Ser Gly Gly Val Gly Ile Ser Thr Gly Thr Phe
 35 40 45

aat aat cag acg gaa ttt aaa ttt ttg gaa aac gga tgg gtg gaa 180
Asn Asn Gln Thr Glu Phe Lys Phe Leu Glu Asn Gly Trp Val Glu
 50 55 60

atc aca gca aac tca agc aga ctt gta cat tta aat atg cca gaa 225

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ile | Thr | Ala | Asn | Ser | Ser | Arg | Leu | Val | His | Leu | Asn | Met | Pro | Glu | | |
| | | | | | | | 65 | | | | 70 | | | | 75 | |
| | | | | | | | | | | | | | | | | |
| agt | gaa | aat | tat | aaa | aga | gta | gtt | gta | aat | aat | atg | gat | aaa | act | 270 | |
| Ser | Glu | Asn | Tyr | Lys | Arg | Val | Val | Val | Asn | Asn | Met | Asp | Lys | Thr | | |
| | | | | | | | 80 | | | 85 | | | | 90 | | |
| | | | | | | | | | | | | | | | | |
| gca | gtt | aaa | gga | aac | atg | gct | tta | gat | gac | act | cat | gta | caa | att | 315 | |
| Ala | Val | Lys | Gly | Asn | Met | Ala | Leu | Asp | Asp | Thr | His | Val | Gln | Ile | | |
| | | | | | | | 95 | | | 100 | | | | 105 | | |
| | | | | | | | | | | | | | | | | |
| gta | aca | cct | tgg | tca | ttg | gtt | gat | gca | aat | gct | tgg | gga | gtt | tgg | 360 | |
| Val | Thr | Pro | Trp | Ser | Leu | Val | Asp | Ala | Asn | Ala | Trp | Gly | Val | Trp | | |
| | | | | | | | 110 | | | 115 | | | | 120 | | |
| | | | | | | | | | | | | | | | | |
| ttt | aat | cca | gga | gat | tgg | caa | cta | att | gtt | aat | act | atg | agt | gag | 405 | |
| Phe | Asn | Pro | Gly | Asp | Trp | Gln | Leu | Ile | Val | Asn | Thr | Met | Ser | Glu | | |
| | | | | | | | 125 | | | 130 | | | | 135 | | |
| | | | | | | | | | | | | | | | | |
| ttg | cat | tta | gtt | agt | ttt | gaa | caa | gaa | att | ttt | aat | gtt | gtt | tta | 450 | |
| Leu | His | Leu | Val | Ser | Phe | Glu | Gln | Glu | Ile | Phe | Asn | Val | Val | Leu | | |
| | | | | | | | 140 | | | 145 | | | | 150 | | |
| | | | | | | | | | | | | | | | | |
| aag | act | gtt | tca | gaa | tct | gct | act | cag | cca | cca | act | aaa | gtt | tat | 495 | |
| Lys | Thr | Val | Ser | Glu | Ser | Ala | Thr | Gln | Pro | Pro | Thr | Lys | Val | Tyr | | |
| | | | | | | | 155 | | | 160 | | | | 165 | | |
| | | | | | | | | | | | | | | | | |
| aat | aat | gat | tta | act | gca | tca | ttg | atg | gtt | gca | tta | gat | agt | aat | 540 | |
| Asn | Asn | Asp | Leu | Thr | Ala | Ser | Leu | Met | Val | Ala | Leu | Asp | Ser | Asn | | |
| | | | | | | | 170 | | | 175 | | | | 180 | | |
| | | | | | | | | | | | | | | | | |
| aat | act | atg | cca | ttt | act | cca | gca | gct | atg | aga | tct | gag | aca | ttg | 585 | |
| Asn | Thr | Met | Pro | Phe | Thr | Pro | Ala | Ala | Met | Arg | Ser | Glu | Thr | Leu | | |
| | | | | | | | 185 | | | 190 | | | | 195 | | |
| | | | | | | | | | | | | | | | | |
| ggg | ttt | tat | cca | tgg | aaa | cca | acc | ata | cca | act | cca | tgg | aga | tat | 630 | |
| Gly | Phe | Tyr | Pro | Trp | Lys | Pro | Thr | Ile | Pro | Thr | Pro | Trp | Arg | Tyr | | |
| | | | | | | | 200 | | | 205 | | | | 210 | | |
| | | | | | | | | | | | | | | | | |
| tat | ttt | caa | tgg | gat | aga | aca | tta | ata | cca | tct | cat | act | gga | act | 675 | |
| Tyr | Phe | Gln | Trp | Asp | Arg | Thr | Leu | Ile | Pro | Ser | His | Thr | Gly | Thr | | |
| | | | | | | | 215 | | | 220 | | | | 225 | | |

"Sequence 295"

| | | |
|---|-----|------|
| agt ggc aca cca aca aat ata tat cat ggt aca gat cca gat gat | | 720 |
| Ser Gly Thr Pro Thr Asn Ile Tyr His Gly Thr Asp Pro Asp Asp | | |
| 230 | 235 | 240 |
| gtt caa ttt tat act att gaa aat tct gtg cca gta cac tta cta | | 765 |
| Val Gln Phe Tyr Thr Ile Glu Asn Ser Val Pro Val His Leu Leu | | |
| 245 | 250 | 255 |
| aga aca ggt gat gaa ttt gct aca gga aca ttt ttt ttt gat tgt | | 810 |
| Arg Thr Gly Asp Glu Phe Ala Thr Gly Thr Phe Phe Asp Cys | | |
| 260 | 265 | 270 |
| aaa cca tgt aga cta aca cat aca tgg caa aca aac aga gca ttg | | 855 |
| Lys Pro Cys Arg Leu Thr His Thr Trp Gln Thr Asn Arg Ala Leu | | |
| 275 | 280 | 285 |
| ggc tta cca cca ttt cta aat tct ttg cct caa tct gaa gga gct | | 900 |
| Gly Leu Pro Pro Phe Leu Asn Ser Leu Pro Gln Ser Glu Gly Ala | | |
| 290 | 295 | 300 |
| act aac ttt ggt gat ata gga gtt caa caa gat aaa aga cgt ggt | | 945 |
| Thr Asn Phe Gly Asp Ile Gly Val Gln Gln Asp Lys Arg Arg Gly | | |
| 305 | 310 | 315 |
| gta act caa atg gga aat aca gac tat att act gaa gct act att | | 990 |
| Val Thr Gln Met Gly Asn Thr Asp Tyr Ile Thr Glu Ala Thr Ile | | |
| 320 | 325 | 330 |
| atg aga cca gct gag gtt ggt tat agt gca cca tat tat tct ttt | | 1035 |
| Met Arg Pro Ala Glu Val Gly Tyr Ser Ala Pro Tyr Tyr Ser Phe | | |
| 335 | 340 | 345 |
| gaa gcg tct aca caa ggg cca ttt aaa ata cct att gca gca gga | | 1080 |
| Glu Ala Ser Thr Gln Gly Pro Phe Lys Ile Pro Ile Ala Ala Gly | | |
| 350 | 355 | 360 |
| cgg ggg gga gcg caa aca gat gaa aat caa gca gca gat ggt gat | | 1125 |
| Arg Gly Gly Ala Gln Thr Asp Glu Asn Gln Ala Ala Asp Gly Asp | | |
| 365 | 370 | 375 |
| cca aga tat gca ttt ggt aga caa cat ggt caa aaa act act aca | | 1170 |
| Pro Arg Tyr Ala Phe Gly Arg Gln His Gly Gln Lys Thr Thr Thr | | |
| 380 | 385 | 390 |
| aca gga gaa aca cct gag aga ttt aca tat ata gca cat caa gat | | 1215 |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Thr | Gly | Glu | Thr | Pro | Glu | Arg | Phe | Thr | Tyr | Ile | Ala | His | Gln | Asp | | |
| | | | | 395 | | | | | | 400 | | | | | 405 | |
| aca | gga | aga | tat | cca | gca | gga | gat | tgg | att | caa | aat | att | aac | ttt | | 1260 |
| Thr | Gly | Arg | Tyr | Pro | Ala | Gly | Asp | Trp | Ile | Gln | Asn | Ile | Asn | Phe | | |
| | | | | 410 | | | | | 415 | | | | | 420 | | |
| aac | ctt | cct | gta | aca | aat | gat | aat | gta | ttg | cta | cca | aca | gat | cca | | 1305 |
| Asn | Leu | Pro | Val | Thr | Asn | Asp | Asn | Val | Leu | Leu | Pro | Thr | Asp | Pro | | |
| | | | | 425 | | | | | 430 | | | | | 435 | | |
| att | gga | ggt | aaa | aca | gga | atc | aac | tat | act | aat | ata | ttt | aat | act | | 1350 |
| Ile | Gly | Gly | Lys | Thr | Gly | Ile | Asn | Tyr | Thr | Asn | Ile | Phe | Asn | Thr | | |
| | | | | 440 | | | | 445 | | | | | | 450 | | |
| tat | ggt | cct | tta | act | gca | tta | aat | aat | gta | cca | cca | gtt | tat | cca | | 1395 |
| Tyr | Gly | Pro | Leu | Thr | Ala | Leu | Asn | Asn | Val | Pro | Pro | Val | Tyr | Pro | | |
| | | | | 455 | | | | 460 | | | | | | 465 | | |
| aat | ggt | caa | att | tgg | gat | aaa | gaa | ttt | gat | act | gac | tta | aaa | cca | | 1440 |
| Asn | Gly | Gln | Ile | Trp | Asp | Lys | Glu | Phe | Asp | Thr | Asp | Leu | Lys | Pro | | |
| | | | | 470 | | | | 475 | | | | | | 480 | | |
| aga | ctt | cat | gta | aat | gca | cca | ttt | gtt | tgt | caa | aat | aat | tgt | cct | | 1485 |
| Arg | Leu | His | Val | Asn | Ala | Pro | Phe | Val | Cys | Gln | Asn | Asn | Cys | Pro | | |
| | | | | 485 | | | | 490 | | | | | | 495 | | |
| ggt | caa | tta | ttt | gta | aaa | gtt | gcg | cct | aat | tta | aca | aat | gaa | tat | | 1530 |
| Gly | Gln | Leu | Phe | Val | Lys | Val | Ala | Pro | Asn | Leu | Thr | Asn | Glu | Tyr | | |
| | | | | 500 | | | | 505 | | | | | | 510 | | |
| gat | cct | gat | gca | tct | gct | aat | atg | tca | aga | att | gta | act | tac | tca | | 1575 |
| Asp | Pro | Asp | Ala | Ser | Ala | Asn | Met | Ser | Arg | Ile | Val | Thr | Tyr | Ser | | |
| | | | | 515 | | | | 520 | | | | | | 525 | | |
| gat | ttt | tgg | tgg | aaa | ggt | aaa | tta | gta | ttt | aaa | gct | aaa | cta | aga | | 1620 |
| Asp | Phe | Trp | Trp | Lys | Gly | Lys | Leu | Val | Phe | Lys | Ala | Lys | Leu | Arg | | |
| | | | | 530 | | | | 535 | | | | | | 540 | | |
| gca | tct | cat | act | tgg | aat | cca | att | caa | caa | atg | agt | att | aat | gta | | 1665 |
| Ala | Ser | His | Thr | Trp | Asn | Pro | Ile | Gln | Gln | Met | Ser | Ile | Asn | Val | | |
| | | | | 545 | | | | 550 | | | | | | 555 | | |
| gat | aac | caa | ttt | aac | tat | cta | cca | aat | aat | att | gga | gct | atg | aaa | | 1710 |

| | | |
|---|-----|------|
| Asp Asn Gln Phe Asn Tyr Leu Pro Asn Asn Ile Gly Ala Met Lys | | |
| 560 | 565 | 570 |
| att gta tat gaa aaa tct caa cta gca cct aga aaa tta tat | | 1752 |
| Ile Val Tyr Glu Lys Ser Gln Leu Ala Pro Arg Lys Leu Tyr | | |
| 575 | 580 | |
| taatatactt actatgtttt tatggttatt acatatcaac tagcacctag | | 1802 |
| aaaattatat taatatactt actatgtttt tatgtttatt acatattatt | | 1852 |
| ttaagattaa ttaaattaca acatagaaaat attgtacttg tatttgatat | | 1902 |
| aggatttaga aggttgtta tatggatac aataactgta agaaaatagaa | | 1952 |
| gaacatttag atcatggta gtatggata caataactgt aagaaaataga | | 2002 |
| agaacattta gatcatggtt agtagttgt tttataaaat gtaattgtaa | | 2052 |
| actattaatg tatgttgtt tggtgtgggt gggtgggtgg tttgccctta | | 2102 |
| gaatatgtta aggacaaaaa aaatcaataa aagacattta aaacttaatg | | 2152 |
| gtctcgata ctgtctataa ggtgaactaa ccttaccata agtatcaact | | 2202 |
| tgtctttaag ggggggggtgg gtgggagatg cacaatatca gttagactgac | | 2252 |
| 2254 | | |

<210> ?

<211> 1575

-212- DNA

1213-300b

-22-

atg gt

卷之三

PDB ID: 1B2D

| | | | |
|---|-----|-----|-----|
| 155 | 160 | 165 | |
| cac tcg agg gtc ttc cct agc ggg aag tgc tca gga gta gcg | | | 546 |
| His Ser Arg Val Phe Pro Ser Gly Lys Cys Ser Gly Val Ala | | | |
| 170 | 175 | 180 | |
| gtg tct tct acc tac tgc tcc act aac cac gat tac acc att | | | 588 |
| Val Ser Ser Thr Tyr Cys Ser Thr Asn His Asp Tyr Thr Ile | | | |
| 185 | 190 | 195 | |
| tgg atg ccc gag aat ccg aga cta ggg atg tct tgt gac att | | | 630 |
| Trp Met Pro Glu Asn Pro Arg Leu Gly Met Ser Cys Asp Ile | | | |
| 200 | 205 | 210 | |
| ttt acc aat agt aga ggg aag aga gca tcc aaa ggg agt gag | | | 672 |
| Phe Thr Asn Ser Arg Gly Lys Arg Ala Ser Lys Gly Ser Glu | | | |
| 215 | 220 | | |
| act tgc ggc ttt gta gat gaa aga ggc cta tat aag tct tta | | | 714 |
| Thr Cys Gly Phe Val Asp Glu Arg Gly Leu Tyr Lys Ser Leu | | | |
| 225 | 230 | 235 | |
| aaa gga gca tgc aaa ctc aag tta tgt gga gtt cta gga ctt | | | 756 |
| Lys Gly Ala Cys Lys Leu Lys Leu Cys Gly Val Leu Gly Leu | | | |
| 240 | 245 | 250 | |
| aga ctt atg gat gga aca tgg gtc gcg atg caa aca tca aat | | | 798 |
| Arg Leu Met Asp Gly Thr Trp Val Ala Met Gln Thr Ser Asn | | | |
| 255 | 260 | 265 | |
| gaa acc aaa tgg tgc gct ccc gat cag ttg gtg aac ctg cac | | | 840 |
| Glu Thr Lys Trp Cys Pro Pro Asp Gln Leu Val Asn Leu His | | | |
| 270 | 275 | 280 | |
| gac ttt cgc tca gac gaa att gag cac ctt gtt gta gag gag | | | 882 |
| Asp Phe Arg Ser Asp Glu Ile Glu His Leu Val Val Glu Glu | | | |
| 285 | 290 | | |
| ttg gtc agg aag aga gag gag tgt ctg gat gca cta gag tcc | | | 924 |
| Leu Val Arg Lys Arg Glu Glu Cys Leu Asp Ala Leu Glu Ser | | | |
| 295 | 300 | 305 | |
| atc atg aca aac aag tca gtg agt ttc aga cgt ctc agt cat | | | 966 |
| Ile Met Thr Thr Lys Ser Val Ser Phe Arg Arg Leu Ser His | | | |
| 310 | 315 | 320 | |

| | | | |
|---|-----|-----|------|
| tta aga aaa ctt gtc cct ggg ttt gga aaa gca tat acc ata Leu Arg Lys Leu Val Pro Gly Phe Gly Lys Ala Tyr Thr Ile 325 | 330 | 335 | 1008 |
| ttc aac aag acc ttg atg gaa gcc gat gct cac tac aag tca Phe Asn Lys Thr Leu Met Glu Ala Asp Ala His Tyr Lys Ser 340 | 345 | 350 | 1050 |
| gtc aga act tgg aat gag atc ctc cct tca aaa ggg tgt tta Val Arg Thr Trp Asn Glu Ile Leu Pro Ser Lys Gly Cys Leu 355 | 360 | | 1092 |
| aga gtt ggg ggg agg tgt cat cct cat gtg aac ggg gtg ttt Arg Val Gly Gly Arg Cys His Pro His Val Asn Gly Val Phe 365 | 370 | 375 | 1134 |
| ttc aat ggt ata ata tta gga cct gac ggc aat gtc tta atc Phe Asn Gly Ile Ile Leu Gly Pro Asp Gly Asn Val Leu Ile 380 | 385 | 390 | 1176 |
| cca gag atg caa tca tcc ctc ctc cag caa cat atg gag ttg Pro Glu Met Gln Ser Ser Leu Leu Gln Gln His Met Glu Leu 395 | 400 | 405 | 1218 |
| ttg gaa tcc tcg gtt atc ccc ctt gtg cac ccc ctg gca gac Leu Glu Ser Ser Val Ile Pro Leu Val His Pro Leu Ala Asp 410 | 415 | 420 | 1260 |
| ccg tct acc gtt ttc aag gac ggt gac gag gct gag gat ttt Pro Ser Thr Val Phe Lys Asp Gly Asp Glu Ala Glu Asp Phe 425 | 430 | | 1302 |
| gtt gaa gtt cac ctt ccc gat gtg cac aat cag gtc tca gga Val Glu Val His Leu Pro Asp Val His Asn Gln Val Ser Gly 435 | 440 | 445 | 1344 |
| gtt gac ttg ggt ctc ccg aac tgg ggg aag tat gta tta ctg Val Asp Leu Gly Leu Pro Asn Trp Gly Lys Tyr Val Leu Leu 450 | 455 | 460 | 1386 |
| agt gca ggg gcc ctg act gcc ttg atg ttg ata att ttc ctg Ser Ala Gly Ala Leu Thr Ala Leu Met Leu Ile Ile Phe Leu 465 | 470 | 475 | 1428 |

| | |
|---|------|
| atg aca tgt tgt aga aga gtc aat cga tca gaa cct acg caa | 1470 |
| Met Thr Cys Cys Arg Arg Val Asn Arg Ser Glu Pro Thr Gln | |
| 480 | 485 |
| | 490 |
| cac aat ctc aga ggg aca ggg agg gag gtg tca gtc act ccc | 1512 |
| His Asn Leu Arg Gly Thr Gly Arg Glu Val Ser Val Thr Pro | |
| 495 | 500 |
| caa agc ggg aag atc ata tct tca tgg gaa tca cac aag agt | 1554 |
| Gln Ser Gly Lys Ile Ile Ser Ser Trp Glu Ser His Lys Ser | |
| 505 | 510 |
| | 515 |
| ggg ggt gag acc aga ctg tga 1575 | |
| Gly Gly Glu Thr Arg Leu | |
| 520 | 524 |

<210> 3

<211> 44

<212> DNA

<213> P11 late promoter and leader sequence

<220>

<223>

<400>
taaaaaatata gtagaatttc attttgtttt tttctatgct

<210> 4

<211> 28

<212> DNA

<213> artificial sequence

<220>

<223> forward primer

<400>

ESTIMATE OF SEQUENCING ERROR RATE

cgggatccat tttccttcg tttgccat 28

<210> 5

<211> 28

<212> DNA

<213> artificial sequence

<220> reverse primer

<223>

<400>

cgggtaccca tttctccgtg ataggtat 28

<210> 6

<211> 18

<212> DNA

<213> artificial sequence

<220> sequencing primer

<223>

<400>

ctacttgcat agataggt 18

<210> 7

<211> 2007

<212> DNA

<213> feline calicivirus

<220>

<223>

<400> 1
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Met Cys Ser Thr Cys Ala Asn Val Leu Lys Tyr Tyr Asp Trp Asp
1 5 10 15

cct cac atc aaa ttg gta atc aac ccc aac aaa ttt cta cat gtt 90
Pro His Ile Lys Leu Val Ile Asn Pro Asn Lys Phe Leu His Val
20 25 30

ggc ttc tgc gat aac cct tta atg tgt tat cct gaa tta cta 135
Gly Phe Cys Asp Asn Pro Leu Met Cys Cys Tyr Pro Glu Leu Leu
35 40 45

cct gaa ttt ggc acc atg tgg gat tgt gat caa tcg cca ctc caa 180
Pro Glu Phe Gly Thr Met Trp Asp Cys Asp Gln Ser Pro Leu Gln
50 55 60

gtc tac ctt gag tca atc ctg ggt gat gat gaa tgg tcc tcc act 225
Val Tyr Leu Glu Ser Ile Leu Gly Asp Asp Glu Trp Ser Ser Thr
65 70 75

cat gaa gca att gac cca gtt gtg cca cca atg cat tgg gat gaa 270
His Glu Ala Ile Asp Pro Val Val Pro Pro Met His Trp Asp Glu
80 85 90

gcc gga aaa atc ttc caa cca cac cct ggc gtc ctt atg cat cac 315
Ala Gly Ile Phe Gln Pro His Pro Gly Val Leu Met His His
95 100 105

ctc atc tgt aag gtt gca gaa gga tgg gac cca aac ctg cca ctt 360
Leu Ile Cys Lys Val Ala Glu Gly Trp Asp Pro Asn Leu Pro Leu
110 115 120

ttc cgc ttg gaa gcg gac gat ggt tcc atc acg aca cct gaa cag 405
Phe Arg Leu Glu Ala Asp Asp Gly Ser Ile Thr Thr Pro Glu Gln
125 130 135

gga aca atg gtt ggt gga gtc att gct gag ccc aac gcc caa atg 450
Gly Thr Met Val Gly Gly Val Ile Ala Glu Pro Asn Ala Gln Met
140 145 150

tca acc gca gct gac atg gcc act ggg aaa agt gtg gac tct gag 495
Ser Thr Ala Ala Asp Met Ala Thr Gly Lys Ser Val Asp Ser Glu

| 155 | 160 | 165 | |
|---|-----|-----|-----|
| tgg gaa gcc ttc ttc tcc ttt cac act agt gtg aac tgg agc aca Trp Glu Ala Phe Phe Ser Phe His Thr Ser Val Asn Trp Ser Thr 170 | 175 | 180 | 540 |
| tct gaa act cag ggg aag ata ctc ttt aaa caa tcc tta gga cca Ser Glu Thr Gln Gly Lys Ile Leu Phe Lys Gln Ser Leu Gly Pro 185 | 190 | 195 | 585 |
| ttg ctc aac ccc tac ctt acc cat ctt gca aag ctg tat gtt gct Leu Leu Asn Pro Tyr Leu Thr His Leu Ala Lys Leu Tyr Val Ala 200 | 205 | 210 | 630 |
| tgg tct ggt tct gtt gat gtt agg ttt tct att tct gga tct ggt Trp Ser Gly Ser Val Asp Val Arg Phe Ser Ile Ser Gly Ser Gly 215 | 220 | 225 | 675 |
| gtc ttt gga ggg aaa tta gct gct att gtt gtg ccg cca gga att Val Phe Gly Gly Lys Leu Ala Ala Ile Val Val Pro Pro Gly Ile 230 | 235 | 240 | 720 |
| gat cct gtt caa agt act tca atg ctg caa tat cct cat gtc ctc Asp Pro Val Gln Ser Thr Ser Met Leu Gln Tyr Pro His Val Leu 245 | 250 | 255 | 765 |
| ttt gat gct cgt caa gtt gaa cct gtt atc ttt tcc att ccc gat Phe Asp Ala Arg Gln Val Glu Pro Val Ile Phe Ser Ile Pro Asp 260 | 265 | 270 | 810 |
| cta aga agc acc tta tat cac ctt atg tct gac act gat acc aca Leu Arg Ser Thr Leu Tyr His Leu Met Ser Asp Thr Asp Thr Thr 275 | 280 | 285 | 855 |
| tcg ttg gta atc atg gtg tac aat gat ctt att aac ccc tat gct Ser Leu Val Ile Met Val Tyr Asn Asp Leu Ile Asn Pro Tyr Ala 290 | 295 | 300 | 900 |
| aat gac tca aac tct tcg ggc tgc att gtc act gtg gaa act aaa Asn Asp Ser Asn Ser Ser Gly Cys Ile Val Thr Val Glu Thr Lys 305 | 310 | 315 | 945 |
| ccg ggg cca gat ttc aag ttt cac ctc tta aaa cct cct ggg tct Pro Gly Pro Asp Phe Lys Phe His Leu Leu Lys Pro Pro Gly Ser 320 | 325 | 330 | 990 |

| | | |
|---|-----|------|
| atg tta act cac gga tct atc cca tct gat cta atc cca aaa tca | | 1035 |
| Met Leu Thr His Gly Ser Ile Pro Ser Asp Leu Ile Pro Lys Ser | | |
| 335 | 340 | 345 |
| tct tcg ctt tgg att gga aat cggtt tgg tct gac ata acc gat | | 1080 |
| Ser Ser Leu Trp Ile Gly Asn Arg Phe Trp Ser Asp Ile Thr Asp | | |
| 350 | 355 | 360 |
| ttt gta att cggtt cct ttt gtgtt ttc cag gca aat cga cac ttt gat | | 1125 |
| Phe Val Ile Arg Pro Phe Val Phe Gln Ala Asn Arg His Phe Asp | | |
| 365 | 370 | 375 |
| ttc aac caa gag aca gca ggtt tgg agc acc cca agg ttt cgcccca | | 1170 |
| Phe Asn Gln Glu Thr Ala Gly Trp Ser Thr Pro Arg Phe Arg Pro | | |
| 380 | 385 | 390 |
| att act atc act atc agt gtt aag gag tca gca aag ctt ggt att | | 1215 |
| Ile Thr Ile Thr Ile Ser Val Lys Glu Ser Ala Lys Leu Gly Ile | | |
| 395 | 400 | 405 |
| gga gtg gcc acc gac tac att gtt ccc ggc ata cca gat gga tgg | | 1260 |
| Gly Val Ala Thr Asp Tyr Ile Val Pro Gly Ile Pro Asp Gly Trp | | |
| 410 | 415 | 420 |
| ccc gac aca aca atc cca ggt gag ttg gta cct gtt ggt gac tat | | 1305 |
| Pro Asp Thr Thr Ile Pro Gly Glu Leu Val Pro Val Gly Asp Tyr | | |
| 425 | 430 | 435 |
| gcc atc act aat ggc acc aac aat gat atc acc aca gct gcg cag | | 1350 |
| Ala Ile Thr Asn Gly Thr Asn Asn Asp Ile Thr Thr Ala Ala Gln | | |
| 440 | 445 | 450 |
| tac gat gca gcc act gag att aga aac aac acc aat ttca gaa ggc | | 1395 |
| Tyr Asp Ala Ala Thr Glu Ile Arg Asn Asn Thr Asn Phe Arg Gly | | |
| 455 | 460 | 465 |
| atg tac att tgt ggt tct ctt caa aga gct tgg ggg gat aag aag | | 1440 |
| Met Tyr Ile Cys Gly Ser Leu Gln Arg Ala Trp Gly Asp Lys Lys | | |
| 470 | 475 | 480 |
| att tca aat act gct ttt atc aca acc ggc acg gtt gat gga gcc | | 1485 |
| Ile Ser Asn Thr Ala Phe Ile Thr Thr Gly Thr Val Asp Gly Ala | | |
| 485 | 490 | 495 |

| | | |
|---|------|------|
| aaa ttg ata ccc agt aat acc att gac caa aca aaa att gcc gta | | 1530 |
| Lys Leu Ile Pro Ser Asn Thr Ile Asp Gln Thr Lys Ile Ala Val | | |
| 500 | 505 | 510 |
| ttc caa gac aca cat gcg aat aag cat gtc cag acc tcg gac gac | | 1575 |
| Phe Gln Asp Thr His Ala Asn Lys His Val Gln Thr Ser Asp Asp | | |
| 515 | 520 | 525 |
| aca ttg gcc ctg ctt ggt tat act ggt att ggt gag gaa gca att | | 1620 |
| Thr Leu Ala Leu Leu Gly Tyr Thr Gly Ile Gly Glu Glu Ala Ile | | |
| 530 | 535 | 540 |
| ggc gct gac cgc gat aga gtt gtg cga att agc gtc ctc ccg gaa | | 1665 |
| Gly Ala Asp Arg Asp Arg Val Val Arg Ile Ser Val Leu Pro Glu | | |
| 545 | 550 | 555 |
| cgt ggc gca cgt ggt ggc aat cac cca atc ttc cac aaa aac tct | | 1710 |
| Arg Gly Ala Arg Gly Gly Asn His Pro Ile Phe His Lys Asn Ser | | |
| 560 | 565 | 570 |
| atc aag ctt ggt tat gta att agg tcc att gat gtg ttc aat tct | | 1755 |
| Ile Lys Leu Gly Tyr Val Ile Arg Ser Ile Asp Val Phe Asn Ser | | |
| 575 | 580 | 585 |
| caa att ctg cat acc tct agg caa ctt tcc ctc aat cat tac tta | | 1800 |
| Gln Ile Leu His Thr Ser Arg Gln Leu Ser Leu Asn His Tyr Leu | | |
| 590 | 595 | 600 |
| ttg tcg cct gac tcc ttt gct gtc tat agg att att gac tct aat | | 1845 |
| Leu Ser Pro Asp Ser Phe Ala Val Tyr Arg Ile Ile Asp Ser Asn | | |
| 605 | 610 | 615 |
| gga tcc tgg ttt gac ata ggc att gat aat gat gga ttt tct ttt | | 1890 |
| Gly Ser Trp Phe Asp Ile Gly Ile Asp Asn Asp Gly Phe Ser Phe | | |
| 620 | 625 | 630 |
| gtt ggt gta tca agt att ggt aaa tta gag ttt cct tta act gcc | | 1935 |
| Val Gly Val Ser Ser Ile Gly Lys Leu Glu Phe Pro Leu Thr Ala | | |
| 635 | 640 | 645 |
| tcc tac atg gga att caa ttg gca aaa att cga ctt gcc tct aac | | 1980 |
| Ser Tyr Met Gly Ile Gln Leu Ala Lys Ile Arg Leu Ala Ser Asn | | |
| 650 | 655 | 660 |
| att agg agt gtg atg aca aaa tta tga | 2007 | |

Ile Arg Ser Val Met Thr Lys Leu

665

<210> 8

<211> 582

<212> DNA

<213> artificial sequence

<220> hemagglutinin left arm

<223>

<400> 1

| | | | | | |
|-------------|------------|------------|-------------|-------------|-----|
| attnaacgca | aatatccatg | gaaaacgcgc | agtatacaga | cgattttta | 50 |
| cagtatttgg | agagtttat | aggaagtata | tagagtagaa | ccagaatttt | 100 |
| gtaaaaataa | atcacattt | tatactaata | tgaaacaact | atcgatagtt | 150 |
| atattgctac | tatcgatagt | atatacaacc | aaacctcatc | ctacacagat | 200 |
| atcaaaaaaa | ctaggcgatg | atgcactct | atcgtgtaat | agaaaacaata | 250 |
| cacatggata | tcttgtcatg | agttcttggt | ataagaaacc | agactccatt | 300 |
| attctcttag | cagccaaaaa | cgatgtcgta | tactttgatg | attatacagc | 350 |
| ggataaaagta | tcatacgatt | caccgtatga | tactctagct | acaattatta | 400 |
| caattaaatc | attgacatct | gcagatgcag | gtacttataat | atgcgcattc | 450 |
| tttataacat | caacaaatga | tacggataaa | atagattatg | aagaataactt | 500 |
| catagatttgc | gttgtaaatc | cagctaatgt | atccactatt | gacgcgattc | 550 |
| tatcaggatc | taatttctcc | gtgataggtt | tc | 582 | |

<210> 9

<211> 447

<212> DNA

<213> artificial sequence

<220> hemagglutinin right arm

<223>

<400> 1

| | | | | | |
|------------|------------|------------|------------|-------------|-----|
| ctctagcgcc | taaccccagg | cgaccgacga | caacctttat | gatacatata | 50 |
| atgaaccaat | atctgtatca | tcctcgatac | caacaacggt | agaaaagtgtt | 100 |
| acaatatcta | ctacaaaata | tacaactagt | gactttatag | agatatttgg | 150 |

| | |
|--|-----|
| cattgtttca ctaatttat tattggccgt ggcgatttc tgtattatat | 200 |
| tatttctgtc gtggacggtc tcgtaaacaa gaaacaaata tattatagat | 250 |
| tttaactcag ataaatgtct ggaataatta aatctatcg tttgagcgga | 300 |
| ccatctgggt ccggcaagac agctatacg aggagactct tacaagatta | 350 |
| tgaaaatata ttggatttg tggtatccc taccactaga tttcctcgtc | 400 |
| ctatggAACG agaagggtgtc gactaccatt acgttaacag agaggcc | 447 |

<210> 10

<211> 40

<212> DNA

<213> artificial sequence

<220> primer P3

<223>

<400> 1

gatacctatc acggagaaat tagatcctga tagaatcg 40

<210> 11

<211> 22

<212> DNA

<213> artificial sequence

<220> primer P1

<223>

<400> 1

attaaacgca aatatccatg gg 22

<210> 12

<211> 27

<212> DNA

<213> artificial sequence
<220> primer F2
<223>
<400> 1
gcggtaaccct ggggttaggc gatagag 27

<210> 13
<211> 20
<212> DNA

<213> artificial sequence
<220> primer P5
<223>
<400> 1
atttctccgt gataggtatc 20

<210> 14
<211> 22
<212> DNA

<213> artificial sequence
<220> primer P5
<223>
<400> 1
ggcctctctg ttaacgtaat gg 22

<210> 15
<211> 22

<212> DNA

<213> artificial sequence

<220> primer P2

<223>

<400> 1

gcgtcgaagt ttgagcatgt gc 22

<210> 16

<211> 40

<212> DNA

<213> artificial sequence

<220> primer P4

<223>

<400> 1

ctcttagcgcc taaccccagg cgaccggacga caacccttat 40

<210> 17

<211> 840

<212> DNA

<213> feline infectious peritonitis virus

<220>

<223>

<400> 1

aaacccaaggc atataatccc gacgaaggcat ttttggttg aactaaacaa a 51

atg aag tac att ttg cta ata ctc gcg tgc ata att gca tgc gtt 96

Met Lys Tyr Ile Leu Leu Ile Leu Ala Cys Ile Ile Ala Cys Val
 1 5 10 15
 tat ggt gaa cgc tac tgt gcc atg caa gac agt ggc ttg cag tgt 141
 Tyr Gly Glu Arg Tyr Cys Ala Met Gln Asp Ser Gly Leu Gln Cys
 20 25 30
 att aat ggc aca aat tca aga tgt caa acc tgc ttt gaa cgt ggt 186
 Ile Gln Gly Thr Gln Ser Arg Cys Gln Thr Cys Phe Glu Arg Gly
 35 40 45
 gat ctt att tgg cat ctt gct aac tgg aac ttc agc tgg tct gta 231
 Asp Leu Ile Trp His Leu Ala Asn Trp Asn Phe Ser Trp Ser Val
 50 55 60
 ata ttg att gtt ttt ata aca gtg tta caa tat ggc aga cca caa 276
 Ile Leu Ile Val Phe Ile Thr Val Leu Gln Tyr Gly Arg Pro Gln
 65 70 75
 ttt agc tgg ctc gtt tat ggc att aaa atg ctg atc atg tgg cta 321
 Phe Ser Trp Leu Val Tyr Gly Ile Lys Met Leu Ile Met Trp Leu
 80 85 90
 tta tgg cct att gtt cta gcg ctt acg att ttt aat gca tac tct 366
 Leu Trp Pro Ile Val Leu Ala Leu Thr Ile Phe Asn Ala Tyr Ser
 95 100 105
 gag tac caa gtt tcc aga tat gta atg ttc ggc ttt agt gtt gca 411
 Glu Tyr Gln Val Ser Arg Tyr Val Met Phe Gly Phe Ser Val Ala
 110 115 120
 ggt gca gtt gta acg ttt gca ctt tgg atg atg tat ttt gtg aga 456
 Gly Ala Val Val Thr Phe Ala Leu Trp Met Met Tyr Phe Val Arg
 125 130 135
 tct gtt cag cta tat aga aga acc aaa tca tgg tgg tct ttt aat 501
 Ser Val Gln Leu Tyr Arg Axa Thr Lys Ser Trp Trp Ser Phe Asn
 140 145 150
 cct gag act aat gca att ctt tgt gtt aat gca ttg ggt aga agt 546
 Pro Glu Thr Asn Ala Ile Leu Cys Val Asn Ala Leu Gly Arg Ser
 155 160 165
 tat gtg ctt ccc tta gat ggt act cct aca ggt gtt acc ctt act 591
 Tyr Val Leu Pro Leu Asp Gly Thr Pro Thr Gly Val Thr Leu Thr

| | | | |
|---|-----|-----|----|
| 170 | 175 | 180 | |
| ctt tca gga aat cta tat gct gaa ggt ttc aaa atg gct ggt 636 | | | |
| Leu Leu Ser Gly Asn Leu Tyr Ala Glu Gly Phe Lys Met Ala Gly | | | |
| 185 | 190 | 195 | |
| ggt tta acc atc gag cat ttg cct aaa tac gtc atg att gct aca 681 | | | |
| Gly Leu Thr Ile Glu His Leu Pro Lys Tyr Val Met Ile Ala Thr | | | |
| 200 | 205 | 210 | |
| cct agt aga acc atc gtt tat aca tta gtt gga aaa caa tta aaa 726 | | | |
| Pro Ser Arg Thr Ile Val Tyr Thr Ile Val Gly Lys Gln Leu Lys | | | |
| 215 | 220 | 225 | |
| gca act act gcc aca gga tgg gct tac tac gta aaa tct aaa gct 771 | | | |
| Ala Thr Thr Ala Thr Gly Trp Ala Tyr Tyr Val Lys Ser Lys Ala | | | |
| 230 | 235 | 240 | |
| ggt gat tac tca aca gaa gca cgt act gac aat ttg agt gaa cat 816 | | | |
| Gly Asp Tyr Ser Thr Glu Ala Arg Thr Asp Asn Leu Ser Glu His | | | |
| 245 | 250 | 255 | |
| gaa aaa tta tta cat atg gtg taa 840 | | | |
| Glu Lys Leu Leu His Met Val | | | |
| 260 | | | |
| <210> 18 | | | |
| <211> 1144 | | | |
| <212> DNA | | | |
| <213> feline infectious peritonitis virus | | | |
| <220> | | | |
| <223> | | | |
| <400> 1 | | | |
| atg gcc aca cag gga caa cgc gtc aac tgg gga gat gaa cct tcc 45 | | | |
| Met Ala Thr Gln Gly Gln Arg Val Asn Trp Gly Asp Glu Pro Ser | | | |
| 1 | 5 | 10 | 15 |
| aaa aga cgt ggt cgt tct aac tct cgt ggt cggt aag aat aat gat 90 | | | |
| Lys Arg Arg Gly Arg Ser Asn Ser Arg Gly Arg Lys Asn Asn Asp | | | |

| | | |
|---|-----|-----|
| 20 | 25 | 30 |
| ata cct ttg tca ttc tac aac ccc att acc ctc gaa caa gga tct | | 135 |
| Ile Pro Leu Ser Phe Tyr Asn Phe Thr Leu Glu Gln Glu Ser | | |
| 35 | 40 | 45 |
| aaa ttt tgg aat tta tgt ccg aga gac ctt gtt ccc aaa gga ata | 180 | |
| Lys Phe Trp Asn Leu Cys Pro Arg Asp Leu Val Pro Lys Gly Ile | | |
| 50 | 55 | 60 |
| ggt aat aag gat caa caa att ggt tat tgg aat aga cag att cgt | 225 | |
| Gly Asn Lys Asp Gln Gln Ile Gly Tyr Trp Asn Arg Gln Ile Arg | | |
| 65 | 70 | 75 |
| tat cgt att gta aaa ggc cag cgt aag gaa ctc gct gag agg tgg | 270 | |
| Tyr Arg Ile Val Lys Gly Gln Arg Lys Glu Leu Ala Glu Arg Trp | | |
| 80 | 85 | 90 |
| ttc ttt tac ttc tta ggt aca gga cct cat gct gat gct aaa ttc | 315 | |
| Phe Phe Tyr Phe Leu Gly Thr Gly Phe His Ala Asp Ala Lys Phe | | |
| 95 | 100 | 105 |
| aaa gac aag att gat gga gtc ttc tgg gtt gca agg gat ggt gcc | 360 | |
| Lys Asp Lys Ile Asp Gly Val Phe Trp Val Ala Arg Asp Gly Ala | | |
| 110 | 115 | 120 |
| atg aac aag ccc aca acg ctt ggc act cgt gga acc aat aac gaa | 405 | |
| Met Asn Lys Pro Thr Thr Leu Gly Thr Arg Gly Thr Asn Asn Glu | | |
| 125 | 130 | 135 |
| tcc aaa cca ctg aga ttt gat ggt aag ata ccg cca cag ttt cag | 450 | |
| Ser Lys Pro Leu Arg Phe Asp Gly Lys Ile Pro Pro Gln Phe Gln | | |
| 140 | 145 | 150 |
| ctt gaa gtg aac cgt tct agg aac aat tca agg tct ggt tct cag | 495 | |
| Leu Glu Val Asn Arg Ser Arg Asn Asn Ser Arg Ser Gly Ser Gln | | |
| 155 | 160 | 165 |
| tct aga tct gtt tca aga aac aga tct caa tct aga gga aga cac | 540 | |
| Ser Arg Ser Val Ser Arg Asn Arg Ser Gln Ser Arg Gly Arg His | | |
| 170 | 175 | 180 |
| cat tcc aat aac cag aat aat gtt gag gat aca att gta gcc | 585 | |
| His Ser Asn Asn Gln Asn Asn Val Glu Asp Thr Ile Val Ala | | |
| 185 | 190 | 195 |

gtg ctt gaa aaa tta ggt gtt act gac aaa caa agg tca cgt tct 630
 Val Leu Glu Lys Leu Gly Val Thr Asp Lys Gln Arg Ser Arg Ser
 200 205 210

 aaa cct aga gaa cgt agt gat tcc aaa cct agg gac aca aca cct 675
 Lys Pro Arg Glu Arg Ser Asp Ser Lys Pro Arg Asp Thr Thr Pro
 215 220 225

 aag aat gcc aac aaa cac acc tgg aag aaa act gca ggc aag gga 720
 Lys Asn Ala Asn Lys His Thr Trp Lys Thr Ala Gly Lys Gly
 230 235 240

 gat gtg aca act ttc tat ggt gct aga agt agt tca gct aac ttt 765
 Asp Val Thr Thr Phe Tyr Gly Ala Arg Ser Ser Ala Asn Phe
 245 250 255

 ggt gat agt gat ctc gtt gcc aat ggt aac gct gcc aaa tgc tac 810
 Gly Asp Ser Asp Leu Val Ala Asn Gly Asn Ala Ala Lys Cys Tyr
 260 265 270

 cct cag ata gct gaa tgt gtt cca tca gtg tct agc ata atc ttt 855
 Pro Gln Ile Ala Glu Cys Val Pro Ser Val Ser Ser Ile Ile Phe
 275 280 285

 ggc agt caa tgg tct gct gaa gaa gct ggt gat caa gtg aaa gtc 900
 Gly Ser Gln Trp Ser Ala Glu Glu Ala Gly Asp Gln Val Lys Val
 290 295 300

 acg ctc act cac acc tac tac ctg cca aag gat gat gcc aaa act 945
 Thr Leu Thr His Thr Tyr Tyr Leu Pro Lys Asp Asp Ala Lys Thr
 305 310 315

 agt caa ttc cta gaa cag att gac gct tac aag cga cct tct gaa 990
 Ser Gln Phe Leu Glu Gln Ile Asp Ala Tyr Lys Atg Pro Ser Glu
 320 325 330

 gtg gct aag gat cag agg caa aga aga tcc cgt tct aag tct gct 1035
 Val Ala Lys Asp Gln Arg Gln Arg Arg Ser Arg Ser Lys Ser Ala
 335 340 345

 gat aag aag cct gag gag ttg tct gta act ctt gtg gag gca tac 1080
 Asp Lys Lys Pro Glu Glu Lys Ser Val Thr Leu Val Glu Ala Tyr
 350 355 360

 aca gat gtg ttt gat gac aca cag gtt gag atg att gat gag gtt 1125

Thr Asp Val Phe Asp Asp Thr Gln Val Glu Met Ile Asp Glu Val
 365 370 375

 acg aac taa acgcattgtc 1144
 Thr Asn
 377

<210> 19

<211> 1979

<212> DNA

<213> feline leukemia virus

<220>

<223>

<400> 1
accaccaatc aagacaccttc ggacagcccc agctcjigacg atccatcaag 50

atg gaa agt cca acg cac cca aaa ccc tct aaa gat aag act ctc 95
Met Glu Ser Pro Thr His Pro Lys Pro Ser Lys Asp Lys Thr Leu
 1 5 10 15

tcg tgg aac tta gcg ttt ctg gtg ggg atc tta ttt aca ata gac 140
Ser Trp Asn Leu Ala Phe Leu Val Gly Ile Leu Phe Thr Ile Asp
 20 25 30

ata gga atg gcc aat cct agt cca cac caa ata tat aat gta act 185
Ile Gly Met Ala Asn Pro Ser Pro His Gln Ile Tyr Asn Val Thr
 35 40 45

tgg gta ata acc aat gta caa act aac acc caa gct aac gcc acc 230
Trp Val Ile Thr Asn Val Gln Thr Asn Thr Gln Ala Asn Ala Thr
 50 55 60

tct atg tta gga acc tta acc gat gcc tac cct acc cta cat gtt 275
Ser Met Leu Gly Thr Leu Thr Asp Ala Tyr Pro Thr Leu His Val
 65 70 75

gac tta tgt gac cta gtg gga gac acc tgg gaa cct ata gtc cta 320
Asp Leu Cys Asp Leu Val Gly Asp Thr Trp Glu Pro Ile Val Leu

Nucleotide sequence

| 80 | 85 | 90 |
|---|-----|-----|
| aac cca acc aat gta aaa cac ggg gca cgt tac tcc tcc tca aaa | | 365 |
| Asn Pro Thr Asn'Val Lys His Gly Ala Arg Tyr Ser Ser Ser Lys | | |
| 95 | 100 | 105 |
| tat gga tgt aaa act aca gat aga aaa aaa cag caa cag aca tac | | 410 |
| Tyr Gly Cys Lys Thr Thr Asp Arg Lys Lys Gln Gln Gln Thr Tyr | | |
| 110 | 115 | 120 |
| ccc ttt tac gtc tgc ccc gga cat gcc ccc tcg ttg ggg cca aag | | 455 |
| Pro Phe Tyr Val Cys Pro Gly His Ala Pro Ser Leu Gly Pro Lys | | |
| 125 | 130 | 135 |
| gga aca cat tgt gga ggg gca caa gat ggg ttt tgt gcc gca tgg | | 500 |
| Gly Thr His Cys Gly Ala Gln Asp Gly Phe Cys Ala Ala Trp | | |
| 140 | 145 | 150 |
| gga tgt gag acc acc gga gaa gct tgg tgg aag ccc acc tcc tca | | 545 |
| Gly Cys Glu Thr Thr Gly Glu Thr Trp Trp Lys Pro Thr Ser Ser | | |
| 155 | 160 | 165 |
| tgg gac tat atc aca gta aaa aga ggg agt agt cag gac aat agc | | 590 |
| Trp Asp Tyr Ile Thr Val Lys Arg Gly Ser Ser Gln Asp Asn Ser | | |
| 170 | 175 | 180 |
| tgt gag gga aaa tgc aac ccc ctg gtt ttg cag ttc acc cag aag | | 635 |
| Cys Glu Gly Lys Cys Asn Pro Leu Val Leu Gln Phe Thr Gln Lys | | |
| 185 | 190 | 195 |
| gga aga caa gcc tct tgg gac gga cct aag atg tgg gga ttg cga | | 680 |
| Gly Arg Gln Ala Ser Trp Asp Gly Pro Lys Met Trp Gly Leu Arg | | |
| 200 | 205 | 210 |
| cta tac cgt aca gga tat gac cct atc gct tta ttc acg gtg tcc | | 725 |
| Leu Tyr Arg Thr Gly Tyr Asp Pro Ile Ala Leu Phe Thr Val Ser | | |
| 215 | 220 | 225 |
| cgg cag gta tca acc att acg ccg cct cag gca atg gga cca aac | | 770 |
| Arg Gln Val Ser Thr Ile Thr Pro Pro Gln Ala Met Gly Pro Asn | | |
| 230 | 235 | 240 |
| cta gtc tta cct gat caa aaa ccc cca tcc cga caa tct caa aca | | 815 |
| Leu Val Leu Pro Asp Gln Lys Pro Pro Ser Arg Gln Ser Gln Thr | | |

| | | |
|--|-----|-----|
| 245 | 250 | 255 |
| ggg tcc aaa gtg gcg acc cag agg ccc caa acg aat gaa agc gcc 860 Gly Ser Lys Val Ala Thr Gln Arg Pro Gln Thr Asn Glu Ser Ala 260 | | |
| 265 | 270 | |
| cca agg tct gtt gcc ccc acc acc atg ggt ccc aaa cg att ggg 905 Pro Arg Ser Val Ala Pro Thr Thr Met Gly Pro Lys Arg Ile Gly 275 | | |
| 280 | 285 | |
| acc gga gat agg tta ata aat tta gta caa ggg aca tac cta gcc 950 Thr Gly Asp Arg Leu Ile Asn Leu Val Gln Gly Thr Tyr Leu Ala 290 | | |
| 295 | 300 | |
| tta aat gcc acc gac ccc aac aaa act aaa gac tgt tgg ctc tgc 995 Leu Asn Ala Thr Asp Pro Asn Lys Thr Lys Asp Cys Trp Leu Cys 305 | | |
| 310 | 315 | |
| ctg gtt tct cga cca ccc tat tac gaa ggg att gca atc tta ggt 1040 Leu Val Ser Arg Pro Pro Tyr Tyr Glu Gly Ile Ala Ile Leu Gly 320 | | |
| 325 | 330 | |
| acc tac agc aac caa aca aac ccc ccc cca tcc tgc cta tct act 1085 Asn Tyr Ser Asn Gln Thr Asn Pro Pro Pro Ser Cys Leu Ser Ile 335 | | |
| 340 | 345 | |
| ccg caa cac aaa cta act ata tct gaa gta tca ggg caa gga atg 1130 Pro Gln His Lys Leu Thr Ile Ser Glu Val Ser Gly Gln Gly Met 350 | | |
| 355 | 360 | |
| tgc ata ggg act gtt cct aaa acc cac cag gct ttg tgc aat aag 1175 Cys Ile Gly Thr Val Pro Lys Thr His Gln Ala Leu Cys Asn Lys 365 | | |
| 370 | 375 | |
| aca caa cag gga cat aca ggg gcg cac tat cta gcc gcc ccc aac 1220 Thr Gln Gln Gly His Thr Gly Ala His Tyr Leu Ala Ala Pro Asn 380 | | |
| 385 | 390 | |
| ggc acc tat tgg gcc tgt aac act gga ctc acc cca tgc att tcc 1265 Gly Thr Tyr Trp Ala Cys Asn Thr Gly Leu Thr Pro Cys Ile Ser 395 | | |
| 400 | 405 | |

atg gcg gtg ctc aat tgg acc tct gat ttt tgt gtc tta atc gaa 1310
Met Ala Val Leu Asn Trp Thr Ser Asp Phe Cys Val Leu Ile Glu
410 415 420

tta tgg ccc aga gtg act tac cat caa ccc gaa tat gtg tac aca 1355
Leu Trp Pro Arg Val Thr Tyr His Gln Pro Glu Tyr Val Tyr Thr
425 430 435

cat ttt gcc aaa gct gtc agg ttc cga aga gaa cca ata tca cta 1400
His Phe Ala Lys Ala Val Arg Phe Arg Axa Glu Pro Ile Ser Leu
440 445 450

acg gtt gcc ctt atg ttg gga gga ctt act gta ggg ggc ata gcc 1445
Thr Val Ala Leu Met Leu Gly Gly Leu Thr Val Gly Gly Ile Ala
455 460 465

gcg ggg gtc gga aca ggg act aaa gcc ctc ctt gaa aca gcc cag 1490
Ala Gly Val Gly Thr Gly Thr Lys Ala Leu Leu Glu Thr Ala Gln
470 475 480

ttc aga caa cta caa atg gcc atg cac aca gac atc cag gcc cta 1535
Phe Arg Gln Leu Gln Met Ala Met His Thr Asp Ile Gln Ala Leu
485 490 495

gaa gaa tca att agt gcc tta gaa aag tcc ctg acc tcc ctt tct 1580
Glu Glu Ser Ile Ser Ala Leu Glu Lys Ser Leu Thr Ser Leu Ser
500 505 510

gaa gta gtc tta caa aac aga cgg ggc cta gat att cta ttc tta 1625
Glu Val Val Leu Gln Asn Arg Arg Glu Leu Asp Ile Leu Phe Leu
515 520 525

caa gag gga ggg ctc tgt gcc gca ttg aaa gaa gaa tgt tgc ttc 1670
Gln Glu Gly Gly Leu Cys Ala Ala Leu Lys Glu Glu Cys Cys Phe
530 535 540

tat gcg gat cac acc gga ctc gtc cga gac aat atg gcc aaa tta 1715
Tyr Ala Asp His Thr Gly Leu Val Arg Asp Asn Met Ala Lys Leu
545 550 555

aga gaa aga cta aaa cag cgg caa caa ctg ttt gac tcc caa cag 1760
Arg Glu Arg Leu Lys Gln Arg Gln Gln Leu Phe Asp Ser Gln Gln
560 565 570

gga tgg ttt gaa gga tgg ttc aac aag tcc ccc tgg ttt aca acc 1805
Gly Trp Phe Glu Gly Trp Phe Asn Lys Ser Pro Trp Phe Thr Thr
575 580 585

cta att tcc tcc att atg ggc ccc tta cta atc cta ctc cta att 1850
Leu Ile Ser Ser Ile Met Gly Pro Leu Leu Ile Leu Leu Leu Ile
590 595 600

ctc ctc ttc ggc cca tgc atc ctt aac cga tta gta caa ttc gta
1895 Leu Leu Phe Gly Pro Cys Ile Leu Asn Arg Leu Val Gln Phe
Val
605 610 615

aaa gac aga ata tct gtg gta cag gct tta att tta acc caa cag
1940 Lys Asp Axa Ile Ser Val Val Gln Ala Leu Ile Leu Thr Gln
Gln
620 625 630

tac caa cag ata aag caa tac gat ccg gac cga cca tga 1979
Tyr Gln Gln Ile Lys Gln Tyr Asp Pro Asp Arg Pro
635 640

<210> 20

<211> 584

<212> PRT

<213> feline panleukopenia peritonitis virus

<220>

<223>

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Met Ser Asp Gly Ala Val Gln Pro Asp Gly Gly Gln Pro Ala Val
5 10 15

Arg Asn Glu Arg Ala Thr Gly Ser Gly Asn Gly Ser Gly Gly Gly
20 25 30
Gly Gly Gly Ser Gly Gly Val Gly Ile Ser Thr Gly Thr Phe
35 40 45

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Asn | Gln | Thr | Glu | Phe | Lys | Phe | Leu | Glu | Asn | Gly | Trp | Val | Glu |
| | | | | | | | | | | | | | | 50 |
| | | | | | | | | | | | | | | 55 |
| | | | | | | | | | | | | | | 60 |
| Ile | Thr | Ala | Asn | Ser | Ser | Arg | Leu | Val | His | Leu | Asn | Met | Pro | Glu |
| | | | | | | | | | | | | | | 65 |
| | | | | | | | | | | | | | | 70 |
| | | | | | | | | | | | | | | 75 |
| Ser | Glu | Asn | Tyr | Lys | Arg | Val | Val | Val | Asn | Asn | Met | Asp | Lys | Thr |
| | | | | | | | | | | | | | | 80 |
| | | | | | | | | | | | | | | 85 |
| | | | | | | | | | | | | | | 90 |
| Ala | Val | Lys | Gly | Asn | Met | Ala | Leu | Asp | Asp | Thr | His | Val | Gln | Ile |
| | | | | | | | | | | | | | | 95 |
| | | | | | | | | | | | | | | 100 |
| | | | | | | | | | | | | | | 105 |
| Val | Thr | Pro | Trp | Ser | Leu | Val | Asp | Ala | Asn | Ala | Trp | Gly | Val | Trp |
| | | | | | | | | | | | | | | 110 |
| | | | | | | | | | | | | | | 115 |
| | | | | | | | | | | | | | | 120 |
| Phe | Asn | Pro | Gly | Asp | Trp | Gln | Leu | Ile | Val | Asn | Thr | Met | Ser | Glu |
| | | | | | | | | | | | | | | 125 |
| | | | | | | | | | | | | | | 130 |
| | | | | | | | | | | | | | | 135 |
| Leu | His | Leu | Val | Ser | Phe | Glu | Gln | Glu | Ile | Phe | Asn | Val | Val | Leu |
| | | | | | | | | | | | | | | 140 |
| | | | | | | | | | | | | | | 145 |
| | | | | | | | | | | | | | | 150 |
| Lys | Thr | Val | Ser | Glu | Ser | Ala | Thr | Gln | Pro | Pro | Thr | Lys | Val | Tyr |
| | | | | | | | | | | | | | | 155 |
| | | | | | | | | | | | | | | 160 |
| | | | | | | | | | | | | | | 165 |
| Asn | Asn | Asp | Leu | Thr | Ala | Ser | Leu | Met | Val | Ala | Leu | Asp | Ser | Asn |
| | | | | | | | | | | | | | | 170 |
| | | | | | | | | | | | | | | 175 |
| | | | | | | | | | | | | | | 180 |
| Asn | Thr | Met | Pro | Phe | Thr | Pro | Ala | Ala | Met | Arg | Ser | Glu | Thr | Leu |
| | | | | | | | | | | | | | | 185 |
| | | | | | | | | | | | | | | 190 |
| | | | | | | | | | | | | | | 195 |
| Gly | Phe | Tyr | Pro | Trp | Lys | Pro | Thr | Ile | Pro | Thr | Pro | Trp | Arg | Tyr |
| | | | | | | | | | | | | | | 200 |
| | | | | | | | | | | | | | | 205 |
| | | | | | | | | | | | | | | 210 |
| Tyr | Phe | Gln | Trp | Asp | Arg | Thr | Leu | Ile | Pro | Ser | His | Thr | Gly | Thr |
| | | | | | | | | | | | | | | 215 |
| | | | | | | | | | | | | | | 220 |
| | | | | | | | | | | | | | | 225 |
| Ser | Gly | Thr | Pro | Thr | Asn | Ile | Tyr | His | Gly | Thr | Asp | Pro | Asp | Asp |
| | | | | | | | | | | | | | | 230 |
| | | | | | | | | | | | | | | 235 |
| | | | | | | | | | | | | | | 240 |
| Val | Gln | Phe | Tyr | Thr | Ile | Glu | Asn | Ser | Val | Pro | Val | His | Leu | Leu |
| | | | | | | | | | | | | | | 245 |
| | | | | | | | | | | | | | | 250 |
| | | | | | | | | | | | | | | 255 |
| Arg | Thr | Gly | Asp | Glu | Phe | Ala | Thr | Gly | Thr | Phe | Phe | Phe | Asp | Cys |
| | | | | | | | | | | | | | | 260 |
| | | | | | | | | | | | | | | 265 |
| | | | | | | | | | | | | | | 270 |

Lys Pro Cys Arg Leu Thr His Thr Trp Gln Thr Asn Axg Ala Leu
275 280 285

Gly Leu Pro Pro Phe Leu Asn Ser Leu Pro Gln Ser Glu Gly Ala
290 295 300

Thr Asn Phe Gly Asp Ile Gly Val Gln Gln Asp Lys Arg Arg Gly
305 310 315

Val Thr Gln Met Gly Asn Thr Asp Tyr Ile Thr Glu Ala Thr Ile
320 325 330

Met Arg Pro Ala Glu Val Gly Tyr Ser Ala Pro Tyr Tyr Ser Phe
335 340 345

Glu Ala Ser Thr Gln Gly Pro Phe Lys Ile Pro Ile Ala Ala Gly
350 355 360

Arg Gly Gly Ala Gln Thr Asp Glu Asn Gln Ala Ala Asp Gly Asp
365 370 375

Pro Arg Tyr Ala Phe Gly Arg Gln His Gly Gln Lys Thr Thr Thr
380 385 390

Thr Gly Glu Thr Pro Glu Arg Phe Thr Tyr Ile Ala His Gln Asp
395 400 405

Thr Gly Arg Tyr Pro Ala Gly Asp Trp Ile Gln Asn Ile Asn Phe
410 415 420

Asn Leu Pro Val Thr Asn Asp Asn Val Leu Leu Pro Thr Asp Pro
425 430 435

Ile Gly Gly Lys Thr Gly Ile Asn Tyr Thr Asn Ile Phe Asn Thr
440 445 450

Tyr Gly Pro Leu Thr Ala Leu Asn Asn Val Pro Pro Val Tyr Pro
455 460 465

Asn Gly Gln Ile Trp Asp Lys Glu Phe Asp Thr Asp Leu Lys Pro
470 475 480

Arg Leu His Val Asn Ala Pro Phe Val Cys Gln Asn Asn Cys Pro
485 490 495

Gly Gln Leu Phe Val Lys Val Ala Pro Asn Leu Thr Asn Glu Tyr
500 505 510

Asp Pro Asp Ala Ser Ala Asn Met Ser Arg Ile Val Thr Tyr Ser
515 520 525

Asp Phe Trp Trp Lys Gly Lys Leu Val Phe Lys Ala Lys Leu Arg
530 535 540

Ala Ser His Thr Trp Asn Pro Ile Gln Gln Met Ser Ile Asn Val
545 550 555

Asp Asn Gln Phe Asn Tyr Leu Pro Asn Asn Ile Gly Ala Met Lys
560 565 570

Ile Val Tyr Glu Lys Ser Gln Leu Ala Pro Arg Lys Leu Tyr
575 580

<210> 21

<211> 524

<212> PRT

<213> rabies virus

<220>

<223>

<400> 1

Met Val Pro Gln Ala Leu Leu Phe Val Pro Leu Leu Val Phe
1 5 10

Pro Leu Cys Phe Gly Lys Phe Pro Ile Tyr Thr Ile Leu Asp
15 20 25

Lys Leu Gly Pro Trp Ser Pro Ile Asp Ile His His Leu Ser
30 35 40

| | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Pro | Asn | Asn | Leu | Val | Val | Glu | Asp | Glu | Gly | Cys | Thr | Asn |
| | | | | 45 | | | 50 | | | | | 55 | |
| | | | | | | | | | | | | | |
| Leu | Ser | Gly | Phe | Ser | Tyr | Met | Glu | Leu | Lys | Val | Gly | Tyr | Ile |
| | | | | 60 | | | | 65 | | | | 70 | |
| | | | | | | | | | | | | | |
| Leu | Ala | Ile | Lys | Met | Asn | Gly | Phe | Thr | Cys | Thr | Gly | Val | Val |
| | | | | 75 | | | | 80 | | | | | |
| | | | | | | | | | | | | | |
| Thr | Glu | Ala | Glu | Thr | Tyr | Thr | Asn | Phe | Val | Gly | Tyr | Val | Thr |
| 85 | | | | 90 | | | | | 95 | | | | |
| | | | | | | | | | | | | | |
| Thr | Thr | Phe | Lys | Arg | Lys | His | Phe | Arg | Pro | Thr | Pro | Asp | Ala |
| 100 | | | | 105 | | | | | 110 | | | | |
| | | | | | | | | | | | | | |
| Cys | Arg | Ala | Ala | Tyr | Asn | Trp | Lys | Met | Ala | Gly | Asp | Pro | Arg |
| | | | | 115 | | | 120 | | | | 125 | | |
| | | | | | | | | | | | | | |
| Tyr | Glu | Glu | Ser | Leu | His | Asn | Pro | Tyr | Pro | Asp | Tyr | Arg | Trp |
| | | | | 130 | | | | 135 | | | 140 | | |
| | | | | | | | | | | | | | |
| Leu | Arg | Thr | Val | Lys | Thr | Thr | Lys | Glu | Ser | Leu | Val | Ile | Ile |
| | | | | 145 | | | | 150 | | | | | |
| | | | | | | | | | | | | | |
| Ser | Pro | Ser | Val | Ala | Asp | Leu | Asp | Pro | Tyr | Asp | Arg | Ser | Leu |
| 155 | | | | 160 | | | | 165 | | | | | |
| | | | | | | | | | | | | | |
| His | Ser | Arg | Val | Phe | Pro | Ser | Gly | Lys | Cys | Ser | Gly | Val | Ala |
| 170 | | | | 175 | | | | | 180 | | | | |
| | | | | | | | | | | | | | |
| Val | Ser | Ser | Thr | Tyr | Cys | Ser | Thr | Asn | His | Asp | Tyr | Thr | Ile |
| | | | | 185 | | | 190 | | | 195 | | | |
| | | | | | | | | | | | | | |
| Trp | Met | Pro | Glu | Asn | Pro | Arg | Leu | Gly | Met | Ser | Cys | Asp | Ile |
| | | | | 200 | | | 205 | | | 210 | | | |
| | | | | | | | | | | | | | |
| Phe | Thr | Asn | Ser | Arg | Gly | Lys | Arg | Ala | Ser | Lys | Gly | Ser | Glu |
| | | | | 215 | | | | 220 | | | | | |
| | | | | | | | | | | | | | |
| Thr | Cys | Gly | Phe | Val | Asp | Glu | Arg | Gly | Leu | Tyr | Lys | Ser | Leu |
| 225 | | | | 230 | | | | | 235 | | | | |
| | | | | | | | | | | | | | |
| Lys | Gly | Ala | Cys | Lys | Leu | Lys | Leu | Cys | Gly | Val | Leu | Gly | Leu |
| | | | | 240 | | | 245 | | | 250 | | | |

Arg Leu Met Asp Gly Thr Trp Val Ala Met Gln Thr Ser Asn
255 260 265

Glu Thr Lys Trp Cys Pro Pro Asp Gln Leu Val Asn Leu His
270 275 280

Asp Phe Arg Ser Asp Glu Ile Glu His Leu Val Val Glu Glu
285 290

Leu Val Arg Lsy Arg Glu Glu Cys Leu Asp Ala Leu Glu Ser
295 300 305

Ile Met Thr Thr Lys Ser Val Ser Phe Arg Arg Leu Ser His
310 315 320

Leu Arg Lys Leu Val Pro Gly Phe Gly Lys Ala Tyr Thr Ile
325 330 335

Phe Asn Lys Thr Leu Met Glu Ala Asp Ala His Tyr Lys Ser
340 345 350

Val Arg Thr Trp Asn Glu Ile Leu Pro Ser Lys Gly Cys Leu
355 360

Arg Val Gly Gly Arg Cys His Pro His Val Asn Gly Val Phe
365 370 375

Phe Asn Gly Ile Ile Leu Gly Pro Asp Gly Asn Val Leu Ile
380 385 390

Pro Glu Met Gln Ser Ser Leu Leu Gln Gln His Met Glu Leu
395 400 405

Leu Glu Ser Ser Val Ile Pro Leu Val His Pro Leu Ala Asp
410 415 420

Pro Ser Thr Val Phe Lys Asp Gly Asp Glu Ala Glu Asp Phe
425 430

Val Glu Val His Leu Pro Asp Val His Asn Gln Val Ser Gly
435 440 445

Val Asp Leu Gly Leu Pro Asn Trp Gly Lys Tyr Val Leu Leu
450 455 460

Ser Ala Gly Ala Leu Thr Ala Leu Met Leu Ile Ile Phe Leu
465 470 475

Met Thr Cys Cys Arg Arg Val Asn Arg Ser Glu Pro Thr Gln
480 485 490

His Asn Leu Arg Gly Thr Gly Arg Glu Val Ser Val Thr Pro
495 500

Gln Ser Gly Lys Ile Ile Ser Ser Trp Glu Ser His Lys Ser
505 510 515

Gly Gly Glu Thr Arg Leu
520 524

<210> 22

<211> 668

<212> PRT

<213> feline calicivirus

<220>

<223>

<400> 1

Met Cys Ser Thr Cys Ala Asn Val Leu Lys Tyr Tyr Asp Trp Asp
1 5 10 15

Pro His Ile Lys Leu Val Ile Asn Pro Asn Lys Phe Leu His Val
20 25 30

Gly Phe Cys Asp Asn Pro Leu Met Cys Cys Tyr Pro Glu Leu Leu
35 40 45

Pro Glu Phe Gly Thr Met Trp Asp Cys Asp Gln Ser Pro Leu Gln
50 55 60

Val Tyr Leu Glu Ser Ile Leu Gly Asp Asp Glu Trp Ser Ser Thr
65 70 75

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Glu | Ala | Ile | Asp | Pro | Val | Val | Pro | Pro | Met | His | Trp | Asp | Glu | |
| | | | | | | | | | | | | | | | 80 |
| | | | | | | | | | | | | | | | 85 |
| | | | | | | | | | | | | | | | 90 |
| Ala | Gly | Lys | Ile | Phe | Gln | Pro | His | Pro | Gly | Val | Leu | Met | His | His | |
| | | | | | | | | | | | | | | | 95 |
| | | | | | | | | | | | | | | | 100 |
| | | | | | | | | | | | | | | | 105 |
| Leu | Ile | Cys | Lys | Val | Ala | Glu | Gly | Trp | Asp | Pro | Asn | Leu | Pro | Leu | |
| | | | | | | | | | | | | | | | 110 |
| | | | | | | | | | | | | | | | 115 |
| | | | | | | | | | | | | | | | 120 |
| Phe | Arg | Leu | Glu | Ala | Asp | Asp | Gly | Ser | Ile | Thr | Thr | Pro | Glu | Gln | |
| | | | | | | | | | | | | | | | 125 |
| | | | | | | | | | | | | | | | 130 |
| | | | | | | | | | | | | | | | 135 |
| Gly | Thr | Met | Val | Gly | Gly | Val | Ile | Ala | Glu | Pro | Asn | Ala | Gln | Met | |
| | | | | | | | | | | | | | | | 140 |
| | | | | | | | | | | | | | | | 145 |
| | | | | | | | | | | | | | | | 150 |
| Ser | Thr | Ala | Ala | Asp | Met | Ala | Thr | Gly | Lys | Ser | Val | Asp | Ser | Glu | |
| | | | | | | | | | | | | | | | 155 |
| | | | | | | | | | | | | | | | 160 |
| | | | | | | | | | | | | | | | 165 |
| Trp | Glu | Ala | Phe | Phe | Ser | Phe | His | Thr | Ser | Val | Asn | Trp | Ser | Thr | |
| | | | | | | | | | | | | | | | 170 |
| | | | | | | | | | | | | | | | 175 |
| | | | | | | | | | | | | | | | 180 |
| Ser | Glu | Thr | Gln | Gly | Lys | Ile | Leu | Phe | Lys | Gln | Ser | Leu | Gly | Pro | |
| | | | | | | | | | | | | | | | 185 |
| | | | | | | | | | | | | | | | 190 |
| | | | | | | | | | | | | | | | 195 |
| Leu | Leu | Asn | Pro | Tyr | Leu | Thr | His | Leu | Ala | Lys | Leu | Tyr | Val | Ala | |
| | | | | | | | | | | | | | | | 200 |
| | | | | | | | | | | | | | | | 205 |
| | | | | | | | | | | | | | | | 210 |
| Trp | Ser | Gly | Ser | Val | Asp | Val | Arg | Phe | Ser | Ile | Ser | Gly | Ser | Gly | |
| | | | | | | | | | | | | | | | 215 |
| | | | | | | | | | | | | | | | 220 |
| | | | | | | | | | | | | | | | 225 |
| Val | Phe | Gly | Gly | Lys | Leu | Ala | Ala | Ile | Val | Val | Pro | Pro | Gly | Ile | |
| | | | | | | | | | | | | | | | 230 |
| | | | | | | | | | | | | | | | 235 |
| | | | | | | | | | | | | | | | 240 |
| Asp | Pro | Val | Gln | Ser | Thr | Ser | Met | Leu | Gln | Tyr | Pro | His | Val | Leu | |
| | | | | | | | | | | | | | | | 245 |
| | | | | | | | | | | | | | | | 250 |
| | | | | | | | | | | | | | | | 255 |
| Phe | Asp | Ala | Arg | Gln | Val | Glu | Pro | Val | Ile | Phe | Ser | Ile | Pro | Asp | |
| | | | | | | | | | | | | | | | 260 |
| | | | | | | | | | | | | | | | 265 |
| | | | | | | | | | | | | | | | 270 |
| Leu | Arg | Ser | Thr | Leu | Tyr | His | Leu | Met | Ser | Asp | Thr | Asp | Thr | Thr | |
| | | | | | | | | | | | | | | | 275 |
| | | | | | | | | | | | | | | | 280 |
| | | | | | | | | | | | | | | | 285 |
| Ser | Leu | Val | Ile | Met | Val | Tyr | Asn | Asp | Leu | Ile | Asn | Pro | Tyr | Ala | |
| | | | | | | | | | | | | | | | 290 |
| | | | | | | | | | | | | | | | 295 |
| | | | | | | | | | | | | | | | 300 |

Asn Asp Ser Asn Ser Ser Gly Cys Ile Val Thr Val Glu Thr Lys
 305 310 315

Pro Gly Pro Asp Phe Lys Phe His Leu Leu Lys Pro Pro Gly Ser
 320 325 330

Met Leu Thr His Gly Ser Ile Pro Ser Asp Leu Ile Pro Lys Ser
 335 340 345

Ser Ser Leu Trp Ile Gly Asn Arg Phe Trp Ser Asp Ile Thr Asp
 350 355 360

Phe Val Ile Arg Pro Phe Val Phe Gln Ala Asn Arg His Phe Asp
 365 370 375

Phe Asn Gln Glu Thr Ala Gly Trp Ser Thr Pro Arg Phe Arg Pro
 380 385 390

Ile Thr Ile Thr Ile Ser Val Lys Glu Ser Ala Lys Leu Gly Ile
 395 400 405

Gly Val Ala Thr Asp Tyr Ile Val Pro Gly Ile Pro Asp Gly Trp
 410 415 420

Pro Asp Thr Thr Ile Pro Gly Glu Leu Val Pro Val Gly Asp Tyr
 425 430 435

Ala Ile Thr Asn Gly Thr Asn Asn Asp Ile Thr Thr Ala Ala Gln
 440 445 450

Tyr Asp Ala Ala Thr Glu Ile Arg Asn Asn Thr Asn Phe Arg Gly
 455 460 465

Met Tyr Ile Cys Gly Ser Leu Gln Arg Ala Trp Gly Asp Lys Lys
 470 475 480

Ile Ser Asn Thr Ala Phe Ile Thr Thr Gly Thr Val Asp Gly Ala
 485 490 495

Lys Leu Ile Pro Ser Asn Thr Ile Asp Gln Thr Lys Ile Ala Val
 500 505 510

Phe Gln Asp Thr His Ala Asn Lys His Val Gln Thr Ser Asp Asp
 515 520 525

Thr Leu Ala Leu Leu Gly Tyr Thr Gly Ile Gly Glu Glu Ala Ile
530 535 540

Gly Ala Asp Arg Asp Arg Val Val Arg Ile Ser Val Leu Pro Glu
545 550 555

Arg Gly Ala Arg Gly Gly Asn His Pro Ile Phe His Lys Asn Ser
560 565 570

Ile Lys Leu Gly Tyr Val Ile Arg Ser Ile Asp Val Phe Asn Ser
575 580 585

Gln Ile Leu His Thr Ser Arg Gln Leu Ser Leu Asn His Tyr Leu
590 595 600

Leu Ser Pro Asp Ser Phe Ala Val Tyr Arg Ile Ile Asp Ser Asn
605 610 615

Gly Ser Trp Phe Asp Ile Gly Ile Asp Asn Asp Gly Phe Ser Phe
620 625 630

Val Gly Val Ser Ser Ile Gly Lys Leu Glu Phe Pro Leu Thr Ala
635 640 645

Ser Tyr Met Gly Ile Gln Leu Ala Lys Ile Arg Leu Ala Ser Asn
650 655 660

Ile Arg Ser Val Met Thr Lys Leu
665

<210> 23

<211> 262

<212> PRT

<213> feline infectious peritonitis virus

<220>

<223>

<400> 1

Met Lys Tyr Ile Leu Leu Ile Leu Ala Cys Ile Ile Ala Cys Val

1

5

10

15

Tyr Gly Glu Arg Tyr Cys Ala Met Gln Asp Ser Gly Leu Gln Cys
 20 25 30

Ile Gln Gly Thr Gln Ser Arg Cys Gln Thr Cys Phe Glu Arg Gly
 35 40 45

Asp Leu Ile Trp His Leu Ala Asn Trp Asn Phe Ser Trp Ser Val
 50 55 60

Ile Leu Ile Val Phe Ile Thr Val Leu Gln Tyr Gly Arg Pro Gln
 65 70 75

Phe Ser Trp Leu Val Tyr Gly Ile Lys Met Leu Ile Met Trp Leu
 80 85 90

Leu Trp Pro Ile Val Leu Ala Leu Thr Ile Phe Asn Ala Tyr Ser
 95 100 105

Glu Tyr Gln Val Ser Arg Tyr Val Met Phe Gly Phe Ser Val Ala
 110 115 120

Gly Ala Val Val Thr Phe Ala Leu Trp Met Met Tyr Phe Val Arg
 125 130 135

Ser Val Gln Leu Tyr Arg Axg Thr Lys Ser Trp Trp Ser Phe Asn
 140 145 150

Pro Glu Thr Asn Ala Ile Leu Cys Val Asn Ala Leu Gly Arg Ser
 155 160 165

Tyr Val Leu Pro Leu Asp Gly Thr Pro Thr Gly Val Thr Leu Thr
 170 175 180

Leu Leu Ser Gly Asn Leu Tyr Ala Glu Gly Phe Lys Met Ala Gly
 185 190 195

Gly Leu Thr Ile Glu His Leu Pro Lys Tyr Val Met Ile Ala Thr
 200 205 210

Pro Ser Arg Thr Ile Val Tyr Thr Ile Val Gly Lys Gln Leu Lys
 215 220 225

Ala Thr Thr Ala Thr Gly Trp Ala Tyr Tyr Val Lys Ser Lys Ala

DRAFT

230 235 240

Gly Asp Tyr Ser Thr Glu Ala Arg Thr Asp Asn Leu Ser Glu His
245 250 255

Glu Lys Leu Leu His Met Val
260

<210> 24

<211> 377

<212> PRT

<213> feline infectious peritonitis virus

<220>

<223>

<400> 1

Met Ala Thr Gln Gly Gln Arg Val Asn Trp Gly Asp Glu Pro Ser
1 5 10 15

Lys Arg Arg Gly Arg Ser Asn Ser Arg Gly Arg Lys Asn Asn Asp
20 25 30

Ile Pro Leu Ser Phe Tyr Asn Phe Ile Thr Leu Glu Gln Glu Ser
35 40 45

Lys Phe Trp Asn Leu Cys Pro Arg Asp Leu Val Pro Lys Gly Ile
50 55 60

Gly Asn Lys Asp Gln Gln Ile Gly Tyr Trp Asn Arg Gln Ile Arg
65 70 75

Tyr Arg Ile Val Lys Gly Gln Arg Lys Glu Leu Ala Glu Arg Trp
80 85 90

Phe Phe Tyr Phe Leu Gly Thr Gly Phe His Ala Asp Ala Lys Phe
95 100 105

Lys Asp Lys Ile Asp Gly Val Phe Trp Val Ala Arg Asp Gly Ala
110 115 120

Met Asn Lys Pro Thr Thr Leu Gly Thr Arg Gly Thr Asn Asn Glu
125 130 135

Ser Lys Pro Leu Arg Phe Asp Gly Lys Ile Pro Pro Gln Phe Gln
140 145 150

Leu Glu Val Asn Arg Ser Arg Asn Asn Ser Arg Ser Gly Ser Gln
155 160 165

Ser Arg Ser Val Ser Arg Asn Arg Ser Gln Ser Arg Gly Arg His
170 175 180

His Ser Asn Asn Gln Asn Asn Asn Val Glu Asp Thr Ile Val Ala
185 190 195

Val Leu Glu Lys Leu Gly Val Thr Asp Lys Gln Arg Ser Arg Ser
200 205 210

Lys Pro Arg Glu Arg Ser Asp Ser Lys Pro Arg Asp Thr Thr Pro
215 220 225

Lys Asn Ala Asn Lys His Thr Trp Lys Lys Thr Ala Gly Lys Gly
230 235 240

Asp Val Thr Thr Phe Tyr Gly Ala Arg Ser Ser Ser Ala Asn Phe
245 250 255

Gly Asp Ser Asp Leu Val Ala Asn Gly Asn Ala Ala Lys Cys Tyr
260 265 270

Pro Gln Ile Ala Glu Cys Val Pro Ser Val Ser Ser Ile Ile Phe
275 280 285

Gly Ser Gln Trp Ser Ala Glu Glu Ala Gly Asp Gln Val Lys Val
290 295 300

Thr Leu Thr His Thr Tyr Tyr Leu Pro Lys Asp Asp Ala Lys Thr
305 310 315

Ser Gln Phe Leu Glu Gln Ile Asp Ala Tyr Lys Atg Pro Ser Glu
320 325 330

Val Ala Lys Asp Gln Arg Gln Arg Arg Ser Arg Ser Lys Ser Ala
335 340 345

Asp Lys Lys Pro Glu Glu Lys Ser Val Thr Leu Val Glu Ala Tyr
350 355 360

Thr Asp Val Phe Asp Asp Thr Gln Val Glu Met Ile Asp Glu Val
365 370 375

Thr Asn
377

<210> 25

<211> 642

<212> PRT

<213> feline leukemia virus

<220>

<223>

<400> 1
Met Glu Ser Pro Thr His Pro Lys Pro Ser Lys Asp Lys Thr Leu
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Ser Trp Asn Leu Ala Phe Leu Val Gly Ile Leu Phe Thr Ile Asp
20 25 30

Ile Gly Met Ala Asn Pro Ser Pro His Gln Ile Tyr Asn Val Thr
35 40 45

Trp Val Ile Thr Asn Val Gln Thr Asn Thr Gln Ala Asn Ala Thr
50 55 60

Ser Met Leu Gly Thr Leu Thr Asp Ala Tyr Pro Thr Leu His Val
65 70 75

Asp Leu Cys Asp Leu Val Gly Asp Thr Trp Glu Pro Ile Val Leu
80 85 90

Asn Pro Thr Asn'Val Lys His Gly Ala Arg Tyr Ser Ser Ser Lys
95 100 105

Tyr Gly Cys Lys Thr Thr Asp Arg Lys Lys Gln Gln Gln Thr Tyr
110 115 120

Pro Phe Tyr Val Cys Pro Gly His Ala Pro Ser Leu Gly Pro Lys
125 130 135

Gly Thr His Cys Gly Gly Ala Gln Asp Gly Phe Cys Ala Ala Trp
140 145 150

Gly Cys Glu Thr Thr Gly Glu Thr Trp Trp Lys Pro Thr Ser Ser
155 160 165

Trp Asp Tyr Ile Thr Val Lys Arg Gly Ser Ser Gln Asp Asn Ser
170 175 180

Cys Glu Gly Lys Cys Asn Pro Leu Val Leu Gln Phe Thr Gln Lys
185 190 195

Gly Arg Gln Ala Ser Trp Asp Gly Pro Lys Met Trp Gly Leu Arg
200 205 210

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Tyr | Arg | Thr | Gly | Tyr | Asp | Pro | Ile | Ala | Leu | Phe | Thr | Val | Ser | 215 | 220 | 225 |
| Arg | Gln | Val | Ser | Thr | Ile | Thr | Pro | Pro | Gln | Ala | Met | Gly | Pro | Asn | 230 | 235 | 240 |
| Leu | Val | Leu | Pro | Asp | Gln | Lys | Pro | Pro | Ser | Arg | Gln | Ser | Gln | Thr | 245 | 250 | 255 |
| Gly | Ser | Lys | Val | Ala | Thr | Gln | Arg | Pro | Gln | Thr | Asn | Glu | Ser | Ala | 260 | 265 | 270 |
| Pro | Arg | Ser | Val | Ala | Pro | Thr | Thr | Met | Gly | Pro | Lys | Arg | Ile | Gly | 275 | 280 | 285 |
| Thr | Gly | Asp | Arg | Leu | Ile | Asn | Leu | Val | Gln | Gly | Thr | Tyr | Leu | Ala | 290 | 295 | 300 |
| Leu | Asn | Ala | Thr | Asp | Pro | Asn | Lys | Thr | Lys | Asp | Cys | Trp | Leu | Cys | 305 | 310 | 315 |
| Leu | Val | Ser | Arg | Pro | Pro | Tyr | Tyr | Glu | Gly | Ile | Ala | Ile | Leu | Gly | 320 | 325 | 330 |
| Asn | Tyr | Ser | Asn | Gln | Thr | Asn | Pro | Pro | Pro | Ser | Cys | Leu | Ser | Ile | 335 | 340 | 345 |
| Pro | Gln | His | Lys | Leu | Thr | Ile | Ser | Glu | Val | Ser | Gly | Gln | Gly | Met | 350 | 355 | 360 |
| Cys | Ile | Gly | Thr | Val | Pro | Lys | Thr | His | Gln | Ala | Leu | Cys | Asn | Lys | 365 | 370 | 375 |
| Thr | Gln | Gln | Gly | His | Thr | Gly | Ala | His | Tyr | Leu | Ala | Ala | Pro | Asn | 380 | 385 | 390 |
| Gly | Thr | Tyr | Trp | Ala | Cys | Asn | Thr | Gly | Leu | Thr | Pro | Cys | Ile | Ser | 395 | 400 | 405 |
| Met | Ala | Val | Leu | Asn | Trp | Thr | Ser | Asp | Phe | Cys | Val | Leu | Ile | Glu | 410 | 415 | 420 |
| Leu | Trp | Pro | Arg | Val | Thr | Tyr | His | Gln | Pro | Glu | Tyr | Val | Tyr | Thr | 425 | 430 | 435 |

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His Phe Ala Lys Ala Val Arg Phe Arg Axg Glu Pro Ile Ser Leu
440 445 450

Thr Val Ala Leu Met Leu Gly Gly Leu Thr Val Gly Gly Ile Ala
455 460 465

Ala Gly Val Gly Thr Gly Thr Lys Ala Leu Leu Glu Thr Ala Gln
470 475 480

Phe Arg Gln Leu Gln Met Ala Met His Thr Asp Ile Gln Ala Leu
485 490 495

Glu Glu Ser Ile Ser Ala Leu Glu Lys Ser Leu Thr Ser Leu Ser
500 505 510

Glu Val Val Leu Gln Asn Arg Arg Glu Leu Asp Ile Leu Phe Leu
515 520 525

Gln Glu Gly Gly Leu Cys Ala Ala Leu Lys Glu Glu Cys Cys Phe
530 535 540

Tyr Ala Asp His Thr Gly Leu Val Arg Asp Asn Met Ala Lys Leu
545 550 555

Arg Glu Arg Leu Lys Gln Arg Gln Gln Leu Phe Asp Ser Gln Gln
560 565 570

Gly Trp Phe Glu Gly Trp Phe Asn Lys Ser Pro Trp Phe Thr Thr
575 580 585

Leu Ile Ser Ser Ile Met Gly Pro Leu Leu Ile Leu Leu Leu Ile
590 595 600

Leu Leu Phe Gly Pro Cys Ile Leu Asn Arg Leu Val Gln Phe Val
605 610 615

Lys Asp Axg Ile Ser Val Val Gln Ala Leu Ile Leu Thr Gln Gln
620 625 630

Tyr Gln Gln Ile Lys Gln Tyr Asp Pro Asp Arg Pro
635 640